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BOTANY.

Chamberlain's "Methods in Plant Histology."¹—The thin volume at hand is based on a series of elementary articles in the *Journal of Applied Microscopy* dealing with methods of studying the finer structure of plants. It is, therefore, a discussion of methods rather than a treatise on plant histology. Chapters dealing with reagents, methods of killing and fixing, staining, sectioning, and mounting deal with the processes named. The directions are given in a clear, straightforward style, and numerical data appear where most desirable. The preparation of reagents is described fully enough, and the absence of citations of indefinite quantities and time limits, which often renders useful books less useful than they might be, is commendable.

The second part deals with the most useful methods of preparing material, from the lowest to the highest groups of plants, and special methods and devices for difficult types of plant life are described. Some of the main features to be looked for are indicated, mainly as a means of judging of the success of the preparation.

Although in no sense a complete work, one rendering Lee's *Vade Mecum* or Zimmermann's *Microtechnique* less necessary, most teachers of botany not themselves primarily histologists will find this volume a very useful addition to their shelf of ready reference books.

R. H. T.

Notes.—Very substantial evidence of activity in the botanical laboratory of the Imperial University of Tokyo, Japan, under the direction of Dr. M. Miyoshi, professor of botany, is at hand in the shape of several papers published in the *Journal of the College of Science* during the current year.

K. Saito² presents an anatomical study of the most important plant fibers of Japan, giving attention especially to those derived from bast cells. The shape, dimensions, markings, contents, and wall structure are indicated, and the reactions of the walls to the most important reagents stated. Several points of interest bearing on the developmental history of certain of these fibers have been

¹ Chamberlain, Charles J. *Methods in Plant Histology*. Chicago, University of Chicago Press, 1901. 159 pp.

² Saito, K. Anatomische Studien über wichtige Faserpflanzen Japans mit besonderer Berücksichtigung der Bastzellen, *Journ. Coll. of Sci., Imp. Univ. Tokyo*, vol. xv, pt. iii (1901), pp. 395-462. 2 pls.

worked out. The work closes with a key for the microscopical identification of the fibers of Japan.

S. Kusano¹ reports investigations made to determine the amount of transpiration taking place in evergreen trees of Japan in winter. He finds that the giving off of water from the foliage at no time actually ceases, even though the minimum temperature (in Hondo) falls to a point several degrees below zero. The time of least transpiration is, however, found to coincide with this minimum, falling in the month of January. Since photosynthetic activity has been shown by Miyake not to come to a complete standstill in winter in the latitude concerned, Kusano concludes that the abundance of evergreen trees in Japan is chiefly due to its favorable climate.

H. Hattori² has studied the action of copper sulphate on certain plants during considerable periods and agrees with those who have previously investigated the effects produced by copper salts in finding that it is extremely toxic in its action. Amputated conifer twigs, seedlings, pot plants, and molds were used in his experiments. Little that is entirely new has been developed, but a number of interesting things are reported. Among others is the fact that copper sulphate in a solution containing 0,000,001 per cent of the salt is not harmful to corn seedlings cultivated in it for considerable periods. The capacity of the soil for fixing considerable quantities of salt supplied to it in solution accounts for the greater amount of copper endured by plants grown in pots of earth. Molds grown in copper containing culture media were found to be stimulated by minimal amounts of the metal, 0,004 per cent to 0,008 per cent being indicated for *Aspergillus* and *Penicillium*, respectively.

T. Inui³ has studied the lower plant organisms connected with the preparation of awamori, an alcoholic, whisky-like beverage brewed in the Luchu Islands (situated between Formosa and the Kiushu Islands).

Boiled rice or millet is inoculated from material of former cultures and, after sufficient growth has been made first on the grain in a

¹ Kusano, S. Transpiration of Evergreen Trees in Winter, *Journ. Coll. of Sci., Imp. Univ. Tokyo*, vol. xv, pt. iii (1901), pp. 313-366. 1 pl.

² Hattori, H. Studien über die Einwirkung des Kupfersulfats auf einige Pflanzen, *Journ. Coll. of Sci., Imp. Univ. Tokyo*, vol. xv, pt. iii (1901), pp. 371-394. 1 pl.

³ Inui, T. Untersuchungen über die niederen Organismen welche sich bei der Zubereitung des alkoholischen Getränkes "Awamori" betheiligen, *Journ. Coll. of Sci., Imp. Univ. Tokyo*, vol. xv, pt. iii (1891), pp. 465-478. 1 pl.

moist atmosphere and afterwards in a more watery preparation, the alcoholic product is obtained by distillation. The author has isolated several new forms from the material used, — *Aspergillus luchuensis*, related to *Aspergillus wentii* Wehmer; *Aspergillus perniciosus*, near the latter; and *Saccharomyces awamori*. He reports the presence of a species of *Monilia* and of *Saccharomyces anomalus*, which latter form produces the characteristic aroma.

Professor Miyoshi¹ makes a second contribution to his study of a mulberry disease called “Ishikubyo,” and comes to most interesting conclusions. The injury is due to a lack of proper balance in the tissue development of the plant. The leaves manufacture more carbohydrates than the conducting system is able to withdraw during the usual time. The woody tissue of affected plants in all parts is also underdeveloped, and a diminished water transpiration results. This account is the more interesting since physiological derangements are not often traced back to ill-balanced tissue formations.

In this connection it may be noted that Suzuki, investigating this disease in the light of Woods’s work on the “mosaic disease” of the tobacco plant, has come to the conclusion that in the mulberry, as in the tobacco, the trouble is due to an overproduction of oxydizing enzymes accompanied by a more or less advanced state of starvation.

Another article by Professor Miyoshi² reveals an extremely perfect means for securing spore dissemination in a new tree-inhabiting Japanese lichen named by the author *Sagedia macrospora*. The rounded sporocarps lie imbedded in the thallus until ripe, when, through the weakening of the tissues surrounding them, they separate from the thallus as free rounded masses. On absorbing water, the sporocarp expands and opens out by means of the hygroscopic properties of the walls, exposing the hymenium. The spore-containing sacs rupture, thus freeing the spores. The fixation of the free sporocarp to the bark of the tree is secured by the sticky outer surface. The sporocarps by repeated moistening and drying can be made to open and close many times, even after killing the living parts by heat or other means.

¹ Miyoshi, M. Untersuchungen über die Schrumpfkrankeheit (“Ishikubyo”) des Maulbeerbaumes. II. Bericht. *Journ. Coll. of Sci., Imp. Univ. Tokyo*, vol. xv, pt. iii (1901), pp. 459–464.

² Miyoshi, M. Ueber die Sporocarpenevacuation und darauf erfolgreiches Sporenausstreuen bei einer Flechte, *Journ. Coll. of Sci., Imp. Univ. Tokyo*, vol. xv, pt. iii (1901), pp. 367–370. 1 pl.

Dr. Robinson's admirable presidential address before the Botanical Society of America, on "Problems and Possibilities of Systematic Botany," is printed in *Science* of September 27.

In the *Annals of Botany* for September, A. H. Church suggests that the substitution of a logarithmic spiral in place of the Archimedean spiral for the genetic and secondary spirals in phyllotactic studies refers this complex subject to a simple relation to the distribution of energy in the growing points.

Two additional works by Rafinesque — a *Florula Lexingtoniensis* and *The American Florist* — have been unearthed by W. J. Fox in the library of the Academy of Natural Sciences of Philadelphia, as appears from a note by him in *Science* of September 27.

An interesting addition to the literature of myrmecophilous plants is a paper presented at the meeting of the British Association last summer by Yapp. The ant galleries of two Malayan species of *Polypodium* are described. An abstract of the paper appears in *Nature* for October 17.

Papers on the fruit and seed structure (by Lonay) and leaf anatomy (by Goffart) of Ranunculaceæ are contained in the *Mémoires de la Société Royale des Sciences de Liège*, Vol. III, issued in July.

From a study of the anatomy and embryogeny of *Nelumbo*, H. L. Lyon concludes, in the current volume of *Minnesota Botanical Studies*, that the Nymphæacæ should be transferred to the monocotyledonous group Helobiae.

Robinia neomexicana is figured in the *Tidskrift* of the Svenska Trädgaardsföreningen for July-August.

Numerous popular varieties of *Begonia semperflorens* are figured from photographs in *Die Gartenwelt* of September 28.

Several Canadian gentians of the section Crossopetalæ are reviewed by Holm in the *Ottawa Naturalist* for November.

In Part II of Vol. VII of the *Contributions from the United States National Herbarium*, Mr. O. F. Cook adduces reasons for believing in the American origin of *Cocos nucifera*.

Scirpus supinus and its North American allies are reviewed by Fernald in *Rhodora* for October.

Mr. Eaton's ninth paper on Equisetum, in the *Fern Bulletin* for October, deals with *E. litorale*.

George H. Curtis has several lists of Kansas diatoms in the *Transactions of the Kansas Academy of Science* for 1899-1900.

The flora of the Azores receives an important addition through the publication in *Nyt Magazin for Naturvidenskaberne* of a paper on the fresh-water diatoms of the archipelago, by Holmboe. The species are European rather than American, and are believed to have been introduced by adhering to migratory birds.

Professor Hitchcock publishes a list of additions to his "List of Plants in my Florida Herbarium" in Vol. XVII of the *Transactions of the Kansas Academy of Science*.

Native Kansas plants adapted to cultivation are discussed by Grace R. Meeker in Vol. XVII of the *Transactions of the Kansas Academy of Science*.

The *Journal of Applied Microscopy* for October contains an illustrated article on the botanical laboratory and garden of the Imperial University at Tokyo, by Miyake.

An excellent portrait of the late Professor Cornu accompanies the September number of the *Bulletin de la Société Botanique de France*.

The *Fern Bulletin* for October contains a portrait of Thomas Meehan.

Trabut begins an illustrated article on caprification as practiced in Algeria, in the *Revue Horticole* of November 9.

A *Flora of the Presidency of Bombay*, by Theodore Cooke, is in course of publication by Taylor & Francis of London. The familiar sequence of orders of Bentham and Hooker is followed, and the single part thus far issued reaches into Rutaceæ.

An extensive report on a botanical survey of the Dismal Swamp region, by Thomas H. Kearney, forms the concluding number of Vol. V of the *Contributions from the United States National Herbarium*, issued under date of November 6.

The plants of western Lake Erie are considered as to their ecological anatomy and distribution by A. J. Pieters in a paper separately printed from the *Bulletin of the United States Fish Commission* for 1901.

Vol. III of Professor Greene's *Plante Bakerianæ* begins with a fascicle of thirty-six pages devoted almost exclusively to the description of new species from Mr. Baker's collections of 1901, on the Gunnison watershed of Colorado.

Four miscellaneous phanerogamous species from Colorado are described by Osterhout in the *Bulletin of the Torrey Botanical Club* for November.

Notes on the vegetation of the Cape Nome region, Alaska, by Collier, are included in the account of the Brooks reconnaissance of Seward Peninsula, recently published by the United States Geological Survey.

A monograph of the genus *Sorbus*, by Hedlund, constitutes No. 1 of Vol. XXXV of the *Kongliga Svenska Vetenskaps-Akademiens Handlingar*.

The volume of *Botaniska Notiser* for 1901 contains (pp. 33-72, 83-106, 155-158) a discussion by Hedlund of the forms of *Ribes rubrum* in the broad sense.

Under the name of *Pilea heptaphyllus*, Dr. Rarmíez describes and figures a representative of the Papayaceæ, in No. 1 of the current volume of *Anales del Instituto Médico Nacional*, of the city of Mexico.

An article on the preparatory fermentation of cacao, by Preyer, published in the *Tropenpflanzer* for April, is reprinted in translation in No. 10 of the *Boletín del Instituto Físico-Geográfico de Costa Rica*.

Various diseases of cacao and sugar cane and bud variation of the latter are discussed in No. 3 of the current volume of the *West Indian Bulletin*, of Barbados.

The chayote, *Sechium edule*, and its varieties are the subject of *Bulletin No. 28* of the Division of Botany of the United States Department of Agriculture, by Mr. Cook, special agent for tropical agriculture.

"Plant Breeding," an illustrated essay by Professor Hays of Minnesota, is published as *Bulletin No. 29* of the Division of Vegetable Physiology and Pathology of the United States Department of Agriculture.

Economic studies of *Rhizophora mangle*, *Avicennia nitida*, and *Eriodendron occidentale* are published in No. 2 of the current volume of *Anales del Instituto Médico Nacional*, of Mexico, which also contains an article, by Martínez del Campo, on plants used in that country as diuretics.

A botanico-economic pamphlet on the Heveas, and the manufacture of rubber from them in Brazil, is issued as a public document by

Sr. J. Barbosa Rodrigues, director of the botanic garden of Rio de Janeiro, under the title *As Heveas ou Seringueiras*.

In No. 1197, "Advance Sheets," of *Consular Reports* is reprinted from the *Venezuelan Herald* an article by Dr. L. Morisse on rubber culture and manufacture in Venezuela from species of Hevea.

Dr. Peckolt is publishing a series of articles on the medicinal plants of Brazil in the *Berichte* of the German Pharmaceutical Society, and an alphabetic list of Portuguese and Tupi names for the economic plants of the same country in the *Pharmaceutical Archives*.

Stem and bark anatomical studies of Hamamelis (by Jensen) and Myrica (by Krembs) are published in the *Pharmaceutical Archives* for July.

From No. 3 of the *Bulletin du Jardin Impérial Botanique de St.-Petersbourg* it appears that 33,697 species and varieties of plants were cultivated in that establishment last year. Some of the principal groups grown under glass are represented as follows: ferns, 798; orchids, 1433; cacti, 748; palms, 402; cycads, 60; conifers, 567; heaths, 186; aroids, 585; bromeliads, 420; succulents, chiefly agaves and aloes, 991. The plants grown in the open air comprise: trees and shrubs, 1240 species and varieties; perennials, 4385; and annuals, 1410. Over 37,000 persons visited the plant houses during the year.

It may not be generally known that an account of the government gardening in the District of Columbia is each year included in the *Report of the Chief of Engineers*. The volume for 1900 contains a list of the woody plants cultivated about the White House.

Sr. Rodrigues, director of the botanic garden of Rio de Janeiro, has begun the publication of a series of French *Contributions du Jardin Botanique de Rio de Janeiro* in quarto pamphlet form.

The tendency of some German investigators to confine their examination of the literature of subjects they investigate to publications by their fellow-countrymen is not inopportune, if somewhat caustically, commented upon by Dr. MacDougal in *Torreya* for November.

An excellent portrait of the late Thomas Meehan is published in *Meehans' Monthly* for December, and a biographic sketch in the January number.

Vol. XXVI of the botanical *Bihang till Kongliga Svenska Vetenskaps-Akademien Handlingar*, forming a thick volume, contains a wide

range of subjects, handled in the characteristically excellent Scandinavian fashion.

The *Ohio Naturalist* for November contains the following botanical articles: Tyler, "Geophilous Plants of Ohio," II; Kellerman, "Ohio Fungi Exsiccataë," with reprint of original descriptions; Schaffner, "The Maximum Height of Plants," III.

Notes on the geotropism of fungus stipes, extrusion of the gametes of *Fucus*, and adaptation of *Spartina polystachya* to environment are published by E. B. Copeland in *Torreya* for November, in an account of the last season's work at the Cold Spring Harbor laboratory.

In Part II of the current volume of *Proceedings of the Academy of Natural Sciences of Philadelphia*, Dr. Harshberger discusses the limits of variation in plants, and Mr. Meehan contributes some observations on the upbending of mature wood in trees.

The anatomy of the conducting tissue of style and stigma is being considered by Guéguen in current numbers of the *Journal de Botanique*.

Eleanor E. Davie has compiled from the writings of the late W. H. Gibson an attractive little book on *Blossom Hosts and Insect Guests*, which, fully illustrated by the author's admirable drawings, is published by Newson & Co. of New York.